

### Volt Drop

This technical bulletin has been created to explain the concept of volt drop to customers and provides an example on how to calculate volt drop from volt drop ratings given in

CBI-electric: african cables Technical Data sheets

A cable of length  $l$  meters, having an effective resistance  $R$  ohms per meter and reactance  $X_L$  ohms per meter, carrying a current  $I$  amperes will develop a voltage drop

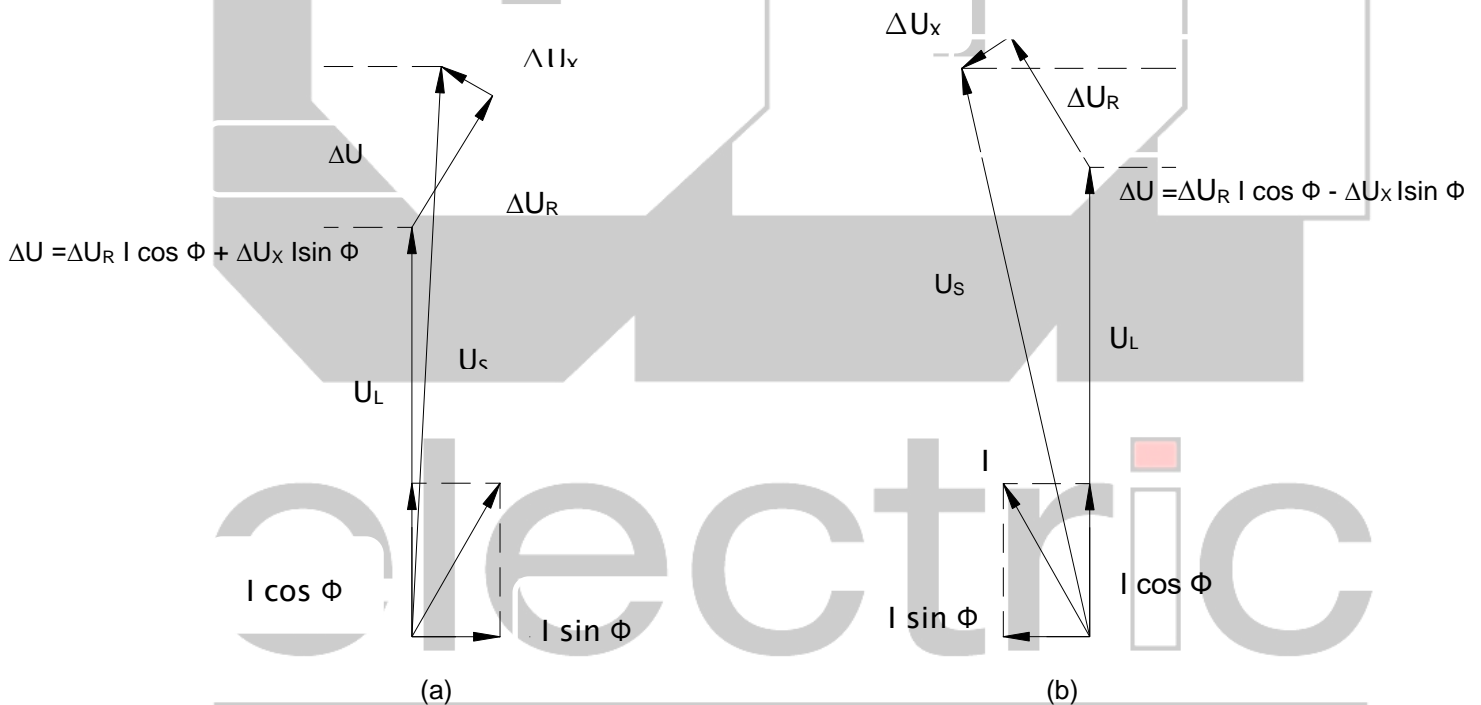
$U_S - U_L = \Delta U$  given by

$\Delta U = I (R \cos \Phi + X_L \sin \Phi)$  for a 3 phase system

$\Delta U = 2 I (R \cos \Phi + X_L \sin \Phi)$  for a single phase system

Where  $\cos \Phi$  is the power factor of the load

$U_S$  is the voltage at the supply end of the cable and  
 $U_L$  is the voltage at the load end of the cable



Vector diagram showing the voltage drop

- (a) With inductive load (lagging phase angle)
- (b) With capacitive load (leading phase angle)

With an inductive load, voltage drop is a maximum when  $\tan \Phi =$  load power factor,

For ease of calculation, Volt Drop is specified in mV per amp per meter of the cable in the technical data sheets.

Use the method as stated below to determine the volt drop:

For a 25mm<sup>2</sup>x4 Cu, PVC, PVC, SWA cable the three phase volt drop is given as 1.51mV/A/m

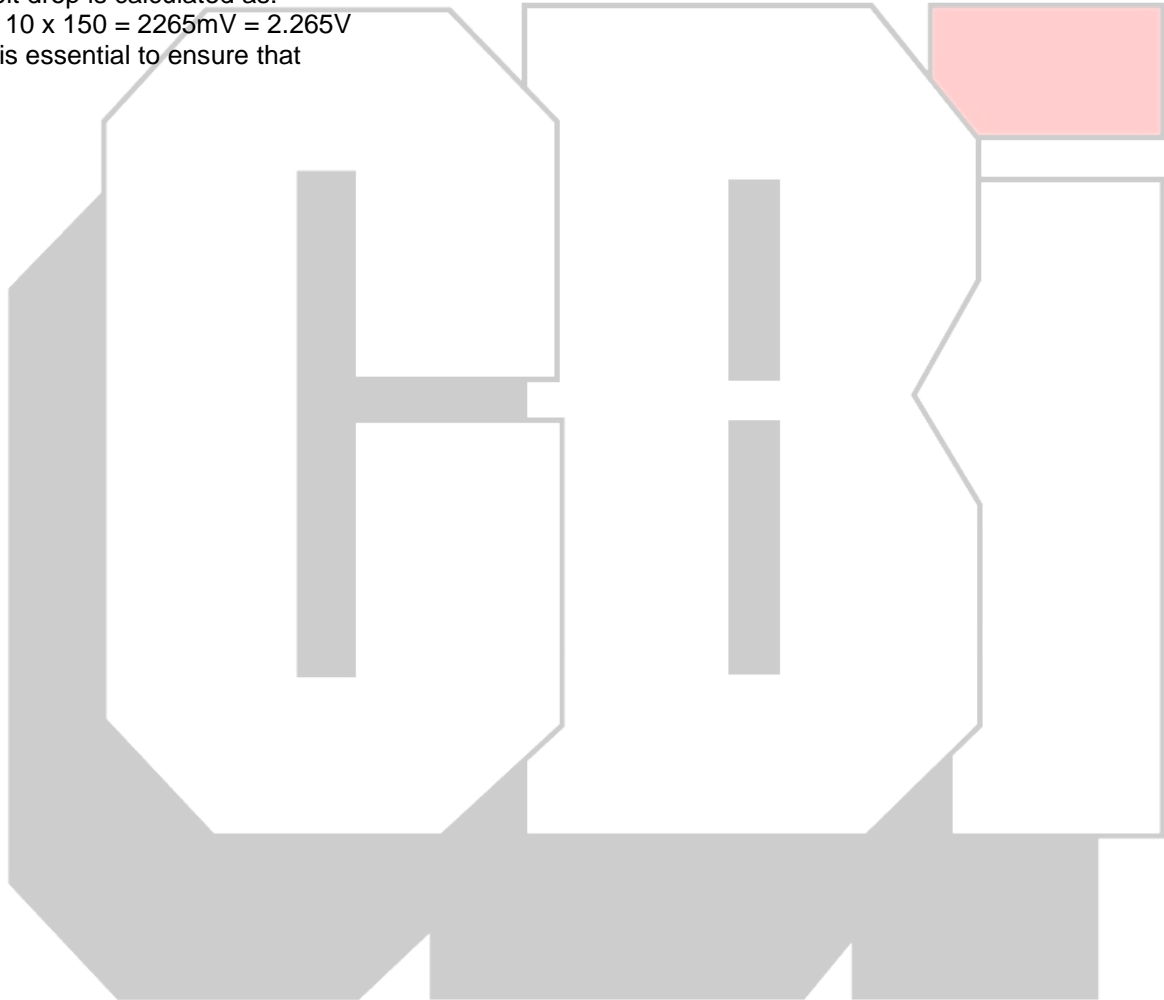
With a Load Current = 10A

& a Cable length of = 150m

The volt drop is calculated as:

$$1.51 \times 10 \times 150 = 2265\text{mV} = 2.265\text{V}$$

NB: It is essential to ensure that



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